

**Guiding National Ocean Research Investment:
The Development of the Ocean Research Priorities Plan**

**First Draft - Public Comments
Compiled through March 27 – April 17, 2006
(end date-May 15, 2006)**

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General Comments

The Ocean Blueprint and the Millennium Ecosystem Assessment report address cultural resources and their significance to community well-being, quality of life, religion and spirituality, sense of place, recreation and tourism, education and knowledge, and social and civic relations. Why are cultural issues, resources, and values so poorly represented in the ORPP?

Claesson, University of New Hampshire

While I applaud the efforts to develop a national research priorities plan I must agree with the preliminary findings of the Federal-State Team on Research Priorities that this plan must encompass not only the blue water of the ocean but also extend inland from the coastal and estuarine brown water to the upstream limits of coastal watersheds. In addition to addressing open ocean concerns, this approach is critical to understanding and addressing the variety of issues considered by the Commission on Ocean Policy.

Toward that end, I would suggest incorporating the text found in endnote i in the opening text of the document to ensure that the reader understands that the term "ocean" includes coastal areas, estuaries, the Great Lakes and their watersheds. In addition, within the text

of the document it was noted that although the term “coast” or “coastal” was used in several areas, “estuary/estuarine” was used infrequently and “watershed” was used but once. To some, this may indicate a lower priority for research/monitoring in these vital areas. I would suggest incorporating these terms in appropriate areas to ensure that it is clear that estuaries and watersheds are included in the research priorities plan.

Day, Indian River Lagoon Nat’l Estuary Program/St. Johns River Water Mgmt

The instructions for the participants in the public comment period states: “We believe that we will make the most progress by establishing a small number of priorities in each of the theme areas that, if funded, would allow us to make substantial progress.” Ignoring the “circularity” implied in the statement that “most progress” will be made by selecting those projects that will allow the community to make the most progress I believe that the coordinators of the workshop and parallel public comment period could greatly enhance the value of this process by elaborating on what would constitute “progress”, such as providing specific metrics that are being sought through enhanced observational programs or research efforts. Let me elaborate on this point by reference to the Theme Section on “The Ocean’s Role in Climate Variability and Change” (pages 27 – 31), with which I am most familiar professionally. I consider this section to be extremely well written, and, to me, all of the proposed activities seem well-motivated and worthwhile. But, how to prioritize among them? Without further guidance on what metrics should be used to define progress, I fear that the workshop groups will “degenerate” into subjective evaluations determined by the “luck of the draw” determined by which participants from which scientific disciplines are in attendance in Denver. (FYI – I will not be able to attend the Denver workshop, due to a long-standing family commitment). Thus, I would urge the JSOST Committee to provide additional guidelines (through a second posting to the Federal Register?) on some preferred methods for defining and evaluating progress in the various research themes.

Hakkarinen, retired, Belmont, California

You fail to mention that many programs/challenges must be international in scope and participation. Gulf of maine with Canada, Bering Sea with Russia and Gulf of Mexico with Mexico. WE can not do it alone and the ocean does not respect political boudaries. We must join the LOS!!!!

Johnson, University of Alaska Fairbanks

I’ve read the March, 2006 version of the Ocean Research Priorities Plan. Overall, this plan offers a concise overview that was understandable and clear. The definition of “ocean” is shown in the Endnotes is broad, including open ocean, coasts and estuaries, Great Lakes and coastal watersheds. An overall comment is that the majority of challenges identified in the themes are associated with watershed sources of coastal problems. Too often, research needs identify open ocean topics. And infrastructural and technological needs are seen as open ocean tools that are likely not applicable to coastal investigations. I would make a recommendation to create a table for each theme that directly links the research needs and infrastructure to the challenges identified. Janet Keough, USEPA

I have included a specific comment below. Overall, I believe the document is a good one that addresses all of the major issues facing the oceans today. Apart from climate change, the greatest impact to the oceans comes from fishing. Thus I believe it is important to be careful and clear on the topics related to fisheries.

Mann, University of Florida

As co-chairs of the National Federation of Regional Associations (NFRA), we provide the following comments on the “Planning Document for the Ocean Research Priorities Plan” as a whole. NFRA is a relatively new organization that represents the 11 Regional Associations that are being formed to bring relevant ocean and Great Lakes information to users through an integrated ocean observing system (IOOS). We provide these comments from our regional IOOS perspective with the goal of contributing to the dialogue anticipated at the Denver workshop.

Overall, our impression is that the document does not present a compelling case for the heightened investments in coastal ocean sciences that we feel are necessary to improve our sensing and predictive capabilities to meet current and future societal needs. Further, while it provides compilations of research needs within societal thematic areas, the document does not articulate a path or plan to address these needs. It is possible that the Ocean Research Priorities Plan Workshop will be tasked to recommend active strategies to augment our ocean research capabilities, but the Workshop agenda is a bit unclear in this regard. Fundamentally, we note that the President’s Ocean Action Plan explicitly calls for:

“Develop an Ocean Research Priorities Plan and Implementation Strategy. The NSTC Joint Subcommittee on Ocean Science and Technology will develop an Ocean Research Priorities Plan and Implementation Strategy by December 31, 2006. The Ocean Research Priorities Plan and Implementation Strategy will seek enhanced collaboration, coordination, cooperation, and synergies, and will identify gaps and deficiencies along with related infrastructure needs.”

The document as written does not provide guidance on the Implementation Strategy called for in the Ocean Action Plan, so we are unable to comment on how any envisioned federal methodology to improve regional coastal ocean research will be executed. Without an understanding of that overall federal implementation strategy, participants at the Ocean Research Priorities Plan Workshop will not know what the impacts of their efforts in suggesting ocean research priorities will be. We understand that the Implementation Strategy could be designed following the development of research priorities at the upcoming Workshop, but note that no information has been provided to the regional IOOS community on when or how this development will occur before the December 31, 2006 deadline.

In light of this and the guidance to reviewers on page eight of the document to “make the most progress by establishing a small number of priorities in each of the theme areas that, if funded, would allow us to make substantial progress”, we suggest the approach of using ‘Grand Challenges’ in each of the thematic areas (e.g., Enhancing human health,

Improving ecosystem health, Sustaining natural resources, etc.) to frame the discussion on ocean research. We suggest that agreeing to a number of Grand Challenges within thematic areas, which by their nature will be interdisciplinary and involve both basic and applied research, could be more advantageous than trying to list a few research topics within each area. In this regard, we define Grand Challenges as being inherently difficult, and, though necessary, beyond our present capabilities to execute. Additionally, Grand Challenges are quantifiable and are designed to make it obvious to see if one has succeeded in addressing them. Below, we offer examples of Grand Challenges for each thematic area that could serve as points of departure for further discussion and refinement.

Example Grand Challenges

- **Enhancing human health:** Within the next decade, develop the capability to competently detect in real time the occurrence, and predict the future state of HAB events out to 72 hours in our regional coastal waters.
- **Improving ecosystem health:** Within the next decade, develop the capability to consistently assess the status of the top five keystone organisms in various regional coastal ecosystems and detect any 10% change in their population or areal coverage; determine the proximate agent(s) of change responsible for such changes.
- **Sustaining natural resources:** Within the next decade, develop the capability to predict the strength of major managed fish stocks six months into the future.
- **Promoting marine operations:** Within the next decade, develop the capability to observe and predict winds, waves, depth varying currents, and bottom type/depths in both regional U.S. and foreign coastal waters.
- **Ocean's role in climate change & variability:** Within the next decade, develop the capability to competently observe and predict regionally specific impacts of ENSO, PDO, etc. climate variability events.
- **Mitigating effects of natural hazards:** Within the next decade, develop the capability to competently predict the landfall strength (w/in 10 knots), landfall time (w/in 4 hours), and landfall location (w/in 50miles) of tropical storms on the U.S. within 48 hours of the event.
- **Improving quality of life:** Within the next decade, develop automated modeling systems capable of assimilating proposed land use changes and accurately predicting their impacts on watershed and coastal zones sufficiently rapidly to allow their use in regional zoning decisions.

As co-chairs of NFRA, we provide this initial input based on our review of the “Planning Document for the Ocean Research Priorities Plan”. We intend to provide additional input

from the entire NFRA membership following our review of the output from the Workshop in Denver, CO focusing on ocean research priorities.

National Federation of Regional Associations (NFRA), Martin and McCammon

I applaud the development of a thoughtful framework and rationale for budgeting within ocean science and the invitation to the community to comment on the ORPP. My expertise is in basic oceanographic research and exploration, but I also am involved in ocean education at the undergraduate and graduate levels, and I am a concerned citizen of a coastal community.

Progress by establishment of a small number of priorities (p. 8) might seem like a sound approach on paper and in Congress, but I urge the JSOST to identify and celebrate alternative (not exclusive) means of ensuring that essential research (basic and applied) outside of the priority areas is supportable and supported. This work should be fundable through peer-reviewed competition to ensure quality; relevance to a short list of priorities within themes should not be a requirement for ALL ocean science. Without a thoughtful balance between creative and directed research, we begin a path toward mediocrity. The crafters of the final ORPP should also be exquisitely sensitive to our inability to identify now all of the priorities of the future; words that acknowledge the need for ocean science priorities to be dynamic and responsive rather than weighted with bureaucratic inertia are imperative. We should not allow ourselves to be forced into science solely or even primarily driven by regional politics.

Van Dover, Biology Department, The College of William & Mary

Specific Comments

Page 7, Line 5: Use of Plan- meaning of last bullet is unclear: “enhanced identification of expected ocean-research based educational products”; suggest “recommendations for ocean-research-based education and outreach products that promote ocean literacy”

Shepard, University of North Carolina at Wilmington

Page 12, Line 1: Insert after “in situ monitoring. . .*at multiple time and spatial scales. . .*”

Shepard, University of North Carolina at Wilmington

Page 14, Line 1 to Page 15, Line 27: To improve health, priorities for restoration of ecosystems health including research and development /testing of new health enhancement techniques. There are emerging and exciting new technologies particularly in the field of oyster restoration, coral reef restoration, reef restoration and erosion control (protecting ecosystem health).

Reef Ball Foundation, Inc., Barber

Page 14, Line 5: Insert after “the integrity. . ., *resiliency*, . . .”

Shepard, University of North Carolina at Wilmington

Page 15-16. 4 out of 5 Research needs for improving ecosystem health address coastal questions and phenomena. Infrastructure needs are almost all open ocean / deep water

technologies. The infrastructure needs section needs to be re-written to identify tools and infrastructure to address coastal research.

Keough, USEPA

Page 15, Line 33: If one uses the pressure/state/response approach for developing indicators for ecosystem health, then one needs to go beyond ecological status (state) to include pressure indicators (human induced stressors) and response of system to management actions to mitigate/reverse adverse effects from these stressors. This would allow a tie in to ecological risk assessment which links: Problem Formulation-Risk Analysis-Risk Communication-Risk Management.

Dow- NMFS/NEFSC

Page 17, Line 8: The statement “methods for integrating marine biological data...” should read “methods for integrating marine biological data collection...” to reflect the need to collect biological information in a manner that is spatially and temporally consistent with the collection of physical and other data. WS Arnold, FWRI

Arnold, Florida FWCC Fish & Wildlife Research

Page 18: Although the objective of the ORPP “is to formulate the priorities for ocean science and technology initiatives across the wide scope of societal interests,” and to identify “specific themes that would incorporate the scope of the use, impact, and interaction of the ocean, coasts, and Great lakes with society,” social and cultural, or anthropological sciences are poorly represented in the ORPP. The only explicit statement regarding these sciences is on page 19, line 28-29, which states that “A critical aspect of any decision-making process in resource management must be supported by research into the human dimension (i.e., economic, social, cultural).” However, the current list of themes does not identify a vision, rationale, challenges, or research needs for the human dimension. There are minimally three themes that must explicitly address this dimension: “Sustaining Natural Resources,” “Improving Quality of Life,” and “Mitigating Effects of Natural Hazards.” The human dimension could be more fully represented in the ORPP under the theme “Sustaining Natural Resources.” The majority of the text under the subheadings of this theme also applies to cultural resources, tangible and intangible, renewable and non-renewable. These resources may include historic and living waterfronts, archaeological resources, cultural landscapes, and maritime lifeways and traditions. The title of this theme should be changed to “Sustaining Natural **and Cultural** Resources.”

Claesson, University of New Hampshire

Page 18: Cultural resources can be addressed within the “Sustaining Natural Resources” theme by explicitly including the word “cultural” within the theme title and statements. For example, page 18, line 25-26, could read “Healthy ocean and coastal natural [and cultural] resources provide the foundation for a huge coastal tourism industry that is continuing to grow rapidly.” Furthermore, page 19, line 38 and page 20, line 1-2, could read “Developing capabilities to map the extent and quantity of natural [and cultural] resources (both living and non-living) in marine, coastal, estuarine, wetland, and atmospheric (avian) systems, particularly across the EEZ and the delineated limits of the

U.S. continental shelf.” Another example might be on, page 20, lines 33-36 “Different geographic regions inherently have diverse natural [and cultural] resources, such as abundant energy sources [and relict prehistoric landscapes and archaeological sites] in the Gulf of Mexico, a significant freshwater supply [and shipwrecks] in the Great Lakes, and large fisheries habitats [and historic/living waterfronts] off the East Coast, and thus various resulting management needs.” The goods and services provided by cultural resources are undervalued in terms of the benefits to quality of life and social stability. Therefore, it is recommended that cultural resources are also addressed in the theme “Improving Quality of Life.” Appropriate places to address these resources could be on page 36, lines 26-28: “The factors that underlie quality of life are the main focus of the U.S. Ocean Action Plan: economic productivity, human and ecosystem health, recreation, pollution mitigation, marine debris cleanup, and conservation of [cultural] resources”; and page 38, line 10-12, “Development of a computer-based geographic information system (GIS) that integrates diverse social, [cultural], economic, geographic, and environmental data, along with an information portal for integrated data dissemination.”

Claesson, University of New Hampshire

Page 18-21. Most of the rationale and challenges associated with sustaining natural resources are coastal (EEZ and continuous inshore waters). None of the description addresses the Great Lakes, yet the GL provide important natural resources for sport fishing and some commercial fishing, as well as clean water for drinking and other uses. Over half of the research needs address coastal issues. The infrastructure needs are too heavily weighted toward open ocean technology, when all of the changes and ecosystem activity is in the coastal zone. Suggest this section be re-written to recognize the needs for information in coastal waters.

Keough, USEPA

Page 18, Line 1 to Page 19, Line 39: Nowhere in the document are included any priorities for physical restoration of ecosystems are research and development /testing of new restoration techniques. There are emerging and exciting new technologies in the field of aquatic reef restoration including the use of designed artificial habitats.

Reef Ball Foundation, Inc., Barber

Page 18, Line 32: Insert after “tidal). . .and new marine natural products,. . .”

Shepard, University of North Carolina at Wilmington

Page 20-21: General Comment: Research needs section should include a socioeconomic component related to overcapacity (too many boats chasing too few fish) and latent capacity (vessels not currently fishing, but which have licenses to fish if the stocks recover). Moving towards an ecosystem approach to management (EAM) for living marine resources (LMRs) will probably include spatial management techniques which will necessitate better understanding of the characteristic spatial/temporal scales of environmental drivers and harvesting by commercial/recreational fishermen/women in relationship to the distribution/abundance of the LMR populations (fish and protected resources).

Dow- NMFS/NEFSC

Page 20, Lines 3-4: habitat characterization of biological resources should include both structural and functional components.

Dow- NMFS/NEFSC

Page 20, Lines 7-9: stock status information should be linked to spatial distribution (historic versus current range); essential fish habitat (EFH) layers in the water column and on the bottom; and distribution/abundance of prey species.

Dow- NMFS/NEFSC

Page 20, Line 12 to Page 21, Line 37: I find the use of the word ‘optimal’ in this section concerning. Optimum sustainable yield has a long and checkered history in fisheries biology—and has ignored species interactions. The ‘optimum’ for fisheries yield for a particular species and the ‘optimum’ populations for ecosystem integrity including non-commercial species could be different things. These are dynamic systems and understanding the dynamics is important. I would avoid using the term ‘optimal’ altogether and just use the word ‘sustainable’.

Mann, University of Florida

Page 21, Line 10: Insert after “expand the. . . *fleet and. . .*”

Shepard, University of North Carolina at Wilmington

Page 21, Line 19: The “Expected Results” section is vague. More concrete statements are needed.

Arnold, Florida FWCC Fish & Wildlife Research

Page 21, Line 33: Besides examining the effects of fishing on target species, it is important to examine the impacts of bycatch of prey forage fish species (non-target) on the target fish/species, since these non-target species are part of the pelagic Essential Fish Habitat of the managed species.

Dow- NMFS/NEFSC

Page 21, Line 34-37: The phrase ‘higher and more sustainable’ is a bit like having your cake and eating it too. There are limits on fishery yields related to how much energy is entering the food web. We have clearly already exceeded maximum fishery yields. I recommend deleting the word ‘higher’.

I would also delete the reference to ‘expanded production from offshore aquaculture’ or minimally qualify it with the word ‘sustainable’. Elementary ecological principles would argue that offshore aquaculture based on the culture of fish at higher trophic levels would be unsustainable if the fish have to be fed other fish. To effectively increase fishery yields, offshore aquaculture would have to focus on the culture of fish at lower trophic levels.

Habitat Alteration: One of the issues that I could not see specifically addressed in this section was habitat alteration/destruction from fishing activities, particularly trawling.
Mann, University of Florida

Page 22, Line 5-7: To support an Ecosystem Approach to Management (EAM), one needs to develop indicators of both ecological health and management effectiveness if one plans to utilize an adaptive management approach.

Dow- NMFS/NEFSC

Page 28-30. A large proportion of the effects of climate change occur along the land-ocean margins, while continental-scale climate is greatly influenced / caused by open ocean phenomena. Coastal observing systems need to be enhanced to detect changes in sea level and environmental changes in coastal watersheds and land margins associated with oceanic drivers. This section might further consider how to couple open ocean information with land-margin effects.

Keough, USEPA

Page 29, Line 25: Insert new bullet: *“Ocean ‘hot spots’— locations of high flux, productivity, and boundary change that require integrated process oriented studies and monitoring over multiple time and spatial scales; examples include HTVs, cold seeps, gas hydrate beds, water mass confluences”*

Shepard, University of North Carolina at Wilmington

Page 30, Line 35: Insert new text/paragraph: *“GOOS and COOS must be maintained. Sensors that put out bad data due to corrosion fouling, and physical disturbance are worse than no sensors at all. Expensive equipment is routinely displaced or lost. Related services are lacking on a national basis. Investment is needed support assets (ships, undersea vehicles) needed to sustain the growing IOOS.”*

Shepard, University of North Carolina at Wilmington

Page 32: “Mitigating Effects of Natural Resources” is a critical theme for sustaining the goods and services of cultural resources and conserving their contribution to human well-being and quality of life. Hazard-mitigation plans are needed for cultural resources in “at-risk communities.” Such plans could address prioritization, protection, research and recovery of paleo- and archaeological data from at-risk sites such as Gay Head Aquinnah on Marthas Vineyard, or they could prioritize maritime cultural sites, buildings, landscapes and events for reconstruction or redevelopment in the event of a natural disaster – resource that are vital to community identity and socio-economic development.

Claesson, University of New Hampshire

Page 36 (NOTE: This is a duplicate general response that was also copied into Sustaining Natural Resources, as the author combined the two chapters in his comments) Cultural resources can be addressed within the “Sustaining Natural Resources” theme by explicitly including the word “cultural” within the theme title and statements. For example, page 18, line 25-26, could read “Healthy ocean and coastal natural [and cultural] resources provide the foundation for a huge coastal tourism industry that is

continuing to grow rapidly.” Furthermore, page 19, line 38 and page 20, line 1-2, could read “Developing capabilities to map the extent and quantity of natural [and cultural] resources (both living and non-living) in marine, coastal, estuarine, wetland, and atmospheric (avian) systems, particularly across the EEZ and the delineated limits of the U.S. continental shelf.” Another example might be on, page 20, lines 33-36 “Different geographic regions inherently have diverse natural [and cultural] resources, such as abundant energy sources [and relict prehistoric landscapes and archaeological sites] in the Gulf of Mexico, a significant freshwater supply [and shipwrecks] in the Great Lakes, and large fisheries habitats [and historic/living waterfronts] off the East Coast, and thus various resulting management needs.” The goods and services provided by cultural resources are undervalued in terms of the benefits to quality of life and social stability. Therefore, it is recommended that cultural resources are also addressed in the theme “Improving Quality of Life.” Appropriate places to address these resources could be on page 36, lines 26-28: “The factors that underlie quality of life are the main focus of the U.S. Ocean Action Plan: economic productivity, human and ecosystem health, recreation, pollution mitigation, marine debris cleanup, and conservation of [cultural] resources”; and page 38, line 10-12, “Development of a computer-based geographic information system (GIS) that integrates diverse social, [cultural], economic, geographic, and environmental data, along with an information portal for integrated data dissemination.”

Claesson, University of New Hampshire

Page 36-38. All of the rationales and all of the challenges associated with improving quality of life are associated with coastal activities. Research needs are nearly all coastal questions. Regional observatories should be fully oriented toward the watershed – coastal continuum of information. In the Great Lakes, for instance, the GLOS is designed as an “open ocean” program. I like the focus on providing watershed-coastal GIS tools for coastal areas.....these are lacking in the Great Lakes and many other regions.

Keough, USEPA

Page 38, Line 18: Rewrite “enhancement of *in situ* observatory and vehicle-based educational tools”

Shepard, University of North Carolina at Wilmington

Page 39: Why not call this chapter “*Exploring the Ocean*”—certainly more interesting; this whole chapter needs to be beefed up and have parallel structure with other chapters—at least the cross-cut chapters should be the same; why not have **Vision Statement, Rationale, Challenges, Research Needs, and Expected Results** like other themes? I think its unfortunate that there is no related working group at meeting in Denver—this is an area that is strongly supported by the USCOP report and stands to “float all boats” in ocean science through increasing public interest. It is especially important to emphasize that exploration is an integral part of the scientific method and must be done in a strategic, guided, organized and integrated manner.

Shepard, University of North Carolina at Wilmington

Page 41-43. The section on observations / infrastructure is far too oriented toward open-ocean components. Most of the Nation's challenges are occurring in coastal waters and coastal watersheds. The RCOOS in the Great Lakes is NOT planning to address coastal waters or watersheds.....the RCOOS should be directed toward information for research and management in coastal waters. OOI should focus its resources and planning on coastal problems, as these are far more likely to realize results than additional infrastructure in open ocean waters. It seems to me that "observing systems" has become associated with "open ocean".....the Nation's states, tribes, and coastal communities would be better served by a focus on coastal waters and watersheds.

Keough, USEPA

Page 41: Again, use parallel structure for this chapter on Obs Infrastructure, or better yet, **eliminate**; does not add much to OOS items dealt with repeatedly in all the main themes.
Shepard, University of North Carolina at Wilmington

Page 44: Suggest changing this chapter title to *Ocean Literacy*; two somewhat distinct paths include outreach and education—both seek to promote public awareness and understanding of the oceans, and develop the nation's next generation of scientists and managers (together, ocean literacy); again, chapter should be rewritten with parallel structure with other themes-- **Vision Statement, Rationale, Challenges, Research Needs, and Expected Results**. Suggest COSEE program consider review and rewrite at May 2006 meeting.

Shepard, University of North Carolina at Wilmington

Page 44, Line 16-31: Will there be an area within the Education section that addresses electronic outreach or online education? I think these areas offer a lot of opportunity for implementing a strategy and hope they'll be considered.

Eskins, Ocean Web Portal Project, Smithsonian National Museum of Natural History

Page 44, Line 30-31: Please consider adding, "The Smithsonian Institution's National Museum of Natural History (NMNH) and the National Oceanic and Atmospheric Administration (NOAA) have partnered to create an Internet-based gateway to high-quality ocean information: the Ocean Web Portal will provide over 30 million visitors a year with a free, world-class ocean education." - <http://ocean.si.edu>

Eskins, Ocean Web Portal Project, Smithsonian National Museum of Natural History